CAN AN EARLY DIAGNOSIS OF PRIMARY CARCINOMA OF THE LUNG BE MADE WITH REASONABLE CERTAINTY?

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The older clinicians and pathologists considered primary malignant disease of the lung as a rare condition. Since the appearance in 1912 of Adler's monograph an increasing interest in the subject has been evident; and numerous statistical reports indicate that primary carcinoma of the lung is not a rare disease. Whether the recent increased incidence of the condition is real or only apparent and due to better diagnosis is unsettled. A recognition of the following factors has directed attention to the possibility of an early and positive diagnosis in most instances of primary carcinoma of the lung.

1. That the disease should be suspected in adults and especially males with obscure pulmonary disease, and particularly if there are signs of bronchial obstruction. Our youngest patient was a woman aged 24, and the oldest a man aged 73. Ninety per cent of our patients were over 35 years of age, and there are four males to one female.

2. That the type of carcinoma that occurs in the region of the hilum of the lung, and 85 to 90 per cent occur in this locality, is practically always bronchiogenic in origin. Indeed interest in the early diagnosis of primary carcinoma of the lung has been stimulated by the recognition that origin from the larger bronchi occurs in the vast majority of cases, and therefore skillful bronchoscopy becomes, in selected cases, the most useful procedure in making a diagnosis.

3. That bronchoscopy not only permits direct visualization of bronchi, but the removal of a section of tissue for histologic study. Without bronchoscopy the diagnosis must often remain in doubt until extrathoracic metastases occur and the tissues are removed by operation or at autopsy.

Clinical Manifestations.

Fried (*Medicine*, 1931, x, No. 4, 373) has recently referred to bronchiogenic cancer as a chronic condition running, as a rule, a

course over a period of several years. He states that the fact that the clinician estimates the duration of the process as being about two years, merely indicates that the disease as such is recognized late, possibly at its terminal period. The onset of symptoms is usually insidious, but may be sudden with hemorrhage, dyspnea, or symptoms resembling an acute bronchitis. Among approximately one-third of our patients the onset was not unlike an acute respiratory tract infection, the patient stating that the initial features were "a cold," "bronchitis with fever," "a cough with pain in the side," and "pneumonia."

The symptomatology of bronchiogenic cancer has been frequently discussed. Briefly, the cough presents no characteristic features; it is not infrequently associated with wheezing, and asthma is a common incorrect diagnosis. Hoarseness occurs in a small per cent of patients (eight per cent in our group). Hemoptysis is common, not characteristic, and rarely fatal. Dyspnea on exertion is common and of varying severity. The expectoration is not infrequently muco-purulent or purulent suggesting pulmonary suppuration. Pain in the chest is not only common, but frequently an early complaint. Dysphagia is usually a late symptom. The general symptoms, fever, weakness, loss of weight, and pallor, are variable in their time of appearance. They usually occur late in the disease. Fever was present in slightly over one-half of our patients at some time while under observation.

The symptoms, the physical signs, and the roentgenographic findings vary so greatly that no set description can be given. The influence of the following factors must be kept in mind: (1) the location of the neoplasm and the rapidity of its growth; (2) the degree of bronchial obstruction produced; (3) the presence of secondary infection and suppuration; (4) the occurrence of pleural involvement, which is not infrequently associated with effusion and (5) the influence of local and general metastases. These factors in varying combinations produce many dissimilar clinical pictures, which may closely resemble other common and rare diseases of the respiratory tract.

Extrathoracic Metastasis.

An early and significant finding clinically is the metastasis to the supraclavicular nodes which when small may easily be over-

looked. Metastasis may occur in any system, and especially the nervous system and skeleton. In our experience extrathoracic metastases are late phenomena. Our patients, however, are seen in the chest clinic. The bronchiogenic cancer may be latent or obscured by the symptoms of metastasis, *e.g.*, the experience reported by Fried and Buckley of metastatic cerebral tumors operated upon for primary growths. These observers state that when a person of middle age has an abrupt onset of symptoms and signs of a rapidly developing intracranial lesion, a metastatic cerebral lesion should be thought of and that the lungs are the most common site of the primary lesion.

Diagnosis: The diagnostic problems are best exemplified by the following case reports. The diagnostic pitfalls are reduced to a minimum if a complete study includes a consideration of the history, physical signs, examination of sputum, roentgenologic studies and bronchoscopic findings. In certain cases there may be some confusion, but if a complete study is carried out a correct diagnosis can be made in a majority of cases.

The following case was very suggestive of pulmonary abscess:

Case 1. Male, age 36, developed cough, expectoration of pus and slight pain in the right chest following tonsillectomy under general anesthesia. He was treated for five months without improvement. At this time a Roentgen study of the chest was made and the findings were interpreted as pulmonary abscess. This checked with the history and the physical signs, which were those of a nonobstructing lesion in the right lower lobe. At bronchoscopy there was found a small area of ulceration involving the wall of the right lower lobe bronchus. A specimen was removed and this proved to be carcinoma of the bronchus.

In the following cases a diagnosis of post-pneumonic abscess of the lung was made.

Case 2. Male, age 51, developed cough, expectoration of pus and weight loss following pneumonia, involving the right lung. By physical examination a diagnosis of a suppurative lesion involving the right lower lung was made. By Roentgen examination a large cavity with a fluid level was observed in the right lower lung. A diagnosis of pulmonary abscess was made. At bronchoscopy there was found a narrowing of the right bronchus by a small ulcerating

neoplasm. A specimen removed at bronchoscopy proved to be carcinoma.

Case 3. Male, age 28, miner by occupation, had a chronic bronchitis for many years. For the past three months he developed considerable cough with expectoration that was blood tinged. There was the usual shortness of breath on exertion that is noticed in cases of anthracosis. The physical signs and Roentgen findings indicated generalized pulmonary changes with, however, a localized massive lesion in the upper part of the right chest. The trachea was displaced to the right. Sputum studies were negative for tubercle bacilli. A tentative diagnosis was pneumoconiosis with either atelectasis of the right upper lobe or localized pulmonary fibrosis. On bronchoscopy there was found a primary bronchial carcinoma occluding the orifice of the right upper lobe bronchus.

Innumerable cases could be cited in which the history or the physical findings are suggestive of a certain lesion, but when a complete study is carried out the correct nature of the lesion becomes apparent. It is to be hoped since early diagnosis is now becoming possible through the aid of bronchoscopy that some of these patients will be seen and correctly diagnosed early so that proper treatment may be instituted.

DISCUSSION.

DR. GORDON WILSON: I think the thing that stands out very well in this paper and that happens in all of our experience was very well brought out by Dr. Soper yesterday when he said that in proportion as we look for a thing we find it. Cancer-conscious, splendid! The trouble is that we are fooled by the mode of onset. The onset is usually bronchial pneumonia and cough, and we fail to remember the axiom that basal lesions should never be considered tuberculous until proved so. Every case of hemoptysis should have an X-ray of his lungs, and in all cases where the lesion is not definitely proved a bronchoscope examination should be called for.

There is one other action which I do believe will help us. That is this: bronchial pneumonia in an adult is practically always a complication, never a primary disease, and many of these cases are diagnosed as bronchial pneumonia because they start off as an atelectasis with fever, which also makes us fail to think of it.

If we bear those facts in mind, being cancer-conscious, I believe we will get these cases early and there will be some hope for them.

DR. JAMES ALEXANDER MILLER: It is always a great pleasure when you have been interested in a group of cases to find others are having similar experience, and I find myself very much at home with these essayists. We have the

privilege of seeing regularly about 40 or 50 cases of proved bronchial carcinoma a year, and these cases are right in line with our experience.

I think that the thing to be emphasized is the fact that these cases are usually in the larger bronchus, accessible to examination by the bronchoscope, and that a very large percentage of them can be so diagnosed and proved there without a doubt. The possibility of early diagnosis, of course, is a very important thing. Not that we can, I think, so often remove the entire growth by the bronchoscope examination, although it has proved to be possible in some cases. But also because I think our experience is exactly in line with that of Dr. Funk that extrapulmonary metastases occur late; if we can make diagnosis early we might be able to do something not only by the bronchoscope but by radical surgery. Here also the variation in malignancy plays a large part. After all, what is a malignant tumor? It is not what you see under the microscope, it is a question of how it acts in the body.

I have a girl twenty-eight years old whom I saw five years ago and made a diagnosis by bronchoscopy of malignant tumor, and I have those slides. They are beautiful, and that tumor today is exactly as it was five years ago. She is teaching school and you cannot persuade her and her mother to have anything done, though she is going to die of carcinoma some day. That type of case I think we can often see if we watch for these cases, although some of those cases have lasted three or four yaars, as has already been demonstrated.

Another thing that I would like to speak about in the diagnostic procedure, and that is that quite a number of these cases quite early get pleural effusion, and you can very frequently by methods of concentration of the fluid and fixation have a regular section, set them up and cut them as you would any section of tissue. In that way you can prove the carcinomatous cells, so I think that through bronchoscopy, through being cancer-conscious, and through the recognition of the fact that in the lung carcinoma is so often associated with symptoms of infection because of its site, we will make the diagnosis in these cases early, and I am sure that as surgery progresses we are going to be able to cure some of these cases just as we cure cancer elsewhere.

DR. ROBEY: This refinement in diagnosis by the bronchoscope is a most interesting one. But all of you, as internists, often go out into the country and see people who look perfectly well, who have good nutrition, often good appetites and good color, yet have a very persistent and irritating cough which annoys them day and night, and perhaps you have but one opportunity to see the patient. There is a physical sign which I thought I had discovered twenty years ago, but, like so many of the things we think we have discovered, when I came to gather some material together for a small paper on this subject I found that McPhedran had already described the sign in Dr. Funk's first slide. He showed an area in the X-ray which is exactly the area, or was the kind of an area that I wanted to describe. When you percuss over such an area you get absolute flatness and airlessness, and very often neither the spoken voice nor the whispered voice will come through. I have found that sign a number of times.

Of course, if you have a very thick pleura, if you have a carcinoma of the

pleura involving a good deal of the pleura, especially if there is the fluid of which Dr. Miller has spoken, which so frequently comes in these cases and which is so frequently bloody, of course that may obscure the sign, but very often if the fluid is withdrawn you get this sign which I speak of very clearly.

I have just had a case within the last few months of a woman who looked perfectly well but who had a cough. She had a story of having had pleuritis some twenty years before. That led her physicians to think that, perhaps, she had a recurrence of tuberculosis. She had this sign very clearly defined, and a tuberculosis expert and I discussed the case and we were both a little in doubt, but I stuck to the diagnosis of carcinoma very largely on this physical sign. Of course she never had the bronchoscope, but she died later with a large nodular liver with ascites and jaundice.

Another case which I saw quite a number of years ago in the Boston City Hospital, where the tubercle bacilli were not found on repeated examinations, where the man had lost a great deal of weight, where he had multiple areas of complete flatness and airlessness in small areas which could be picked up, and there the diagnosis was a multiple carcinoma of both lungs. Some of these areas over which we undoubtedly got flatness were as large as hen's eggs.

DR. PACKARD: In these young people with bronchiectasis which seems to have persisted for three or four years, is the bronchiectasis secondary to the carcinoma or may carcinoma develop as the result of the long standing bronchiectasis?

DR. FUNK: Our experience, Dr. Packard, would lead us to believe that bronchiectasis is secondary to the bronchial obstruction.

Answering Drs. Miller and Robey, there is one point I omitted to mention in my presentation, and that is wheezing. Wheezing is not uncommon and a great many of these patients come to us with a tentative diagnosis of asthma because of the wheezing due to the bronchial obstruction.

The onset in one-third of the patients is rather acute. The symptoms in one-third are of respiratory tract infection and pulmonary hemorrhage.

I don't want you to get the impression that we treat all these patients bronchoscopically; on the contrary, wherever possible, we apply to surgery for aid, for, after all, that is the best way to cure cancer; that is, to remove it.